



October 2008

NASA Plum Brook Reactor Facility Decommissioning Project Plum Brook Off-site Sampling Update

This fact sheet summarizes the results of NASA's extensive off-site sampling program of areas along Plum Brook. The program began in October 2005 when sampling in some off-site areas adjacent to Plum Brook detected small amounts of cesium in some sediment samples. NASA determined that the cesium had originated in permitted discharges of water during normal reactor operations (1961-73). At that time, NASA notified the U.S. Nuclear Regulatory Commission (NRC), the Ohio Department of Health (ODH), county and local agencies, and Plum Brook neighbors. NASA subsequently conducted an extensive off-site sampling program. It covered more than 1,200 sediment samples in an area extending from the NASA fence line to Route 2. All results were closely examined and no sample posed any public health concern. Nothing was present in the surface water of Plum Brook.

To identify every possible area where the material may have migrated over time, NASA hired Sandusky-based hydrogeological consultants, Haag Environmental. From February 2006 through January 2008, Haag scientists and staff analyzed nearly 2,000 more sediment samples, taken from areas both near and away from Plum Brook Station. Areas included the mouth of Plum Brook, Putnam Marsh and nearby wetlands, and East Sandusky Bay (where it was confirmed that the drinking water source was safe). The results again confirmed that none of the levels found presented any public health concern and were consistent with previous sampling. NASA provided the NRC, ODH, and county and local officials with a series of sampling results reports earlier this year.

As was noted, none of the cesium levels found during the off-site sampling program posed any public health concern. In fact, the dose from existing levels is indistinguishable from naturally occurring background levels. During the past few months, NASA has closely examined land uses along Plum Brook, to see how people could come into contact with cesium, and developed what are called "exposure scenarios." Each looked at how people might come into contact with the cesium in off-site areas of Plum Brook in ways that would be different from what is termed the Resident Farmer Scenario for the reactor site. This scenario assumes that, at the end of decommissioning a family could live at the former reactor site, drink its groundwater and grow crops there - and be exposed to no more than 25 millirem of radiation per year above background levels.

The off-site scenarios examined possible exposure pathways, such as direct exposure, inhalation, sediment ingestion and vegetable consumption (from a nearby garden specific to the off-site areas). Using the sampling results, NASA considered the possible dose someone might get by gardening (Suburban Gardener Scenario), as a Brookside Resident, a Plum Country Club Maintenance Worker, people enjoying a day of recreation (Natural Area Recreation Day User) and as a child playing in Plum Brook. The analysis showed that the "highest" exposure scenario resulted in an estimated dose of 0.17 millirem per year above normal background radiation levels in northern Ohio (for the Brookside Resident Scenario). For perspective, the average annual dose an individual receives from all sources is 360 millirem. NASA must ensure that at the end of the Reactor Facility Decommissioning, nobody on or off site is exposed to an additional dose of 25 millirem per year above this background level.

NASA developed what are termed Derived Concentration Guideline Levels (DCGLs) for each isotope that is on site at the Reactor Facility. These DCGL cleanup levels are developed to ensure that, at the end of decommissioning, the site is clean enough for any reuse. Within the Reactor Facility fence line, the dose resulting from all the individual DCGLs cannot exceed 25 millirem above naturally occurring background radiation levels.

In the total of 3,141 samples taken, the average cesium level found in Plum Brook sediment was one picocurie per gram, 12 times less than the on-site decommissioning cleanup level. Over 96% of all samples taken had levels of 12 picocuries or less. Throughout decommissioning, NASA has taken a prudent approach to keep any exposure to radiation as low as is reasonably achievable, a standard known as ALARA. This standard may result in NASA conducting some spot cleanup (likely requiring only shovels and buckets) in a few easily accessible off-site areas.

NASA presented its characterization and analysis results at a public meeting held by the NRC on September 3, 2008 at the Huron Public Library. The NRC subsequently approved NASA's cleanup approach, which will ensure that - both on and off site of the NASA Plum Brook Station Reactor Facility - there will be no additional dose of 25 millirem above background at the end of the decommissioning. NASA will continue to update the community on the project's cleanup efforts and will work with NRC and ODH on any cleanup measures that may be appropriate. ■

**If you have any questions on this or any aspect of decommissioning, please call our
24-hour, toll-free Decommissioning Information Line at 1-800-260-3838
(press Option 4 to leave a message) or visit our Website Mailbox at www.grc.nasa.gov/WWW/pbrf.**